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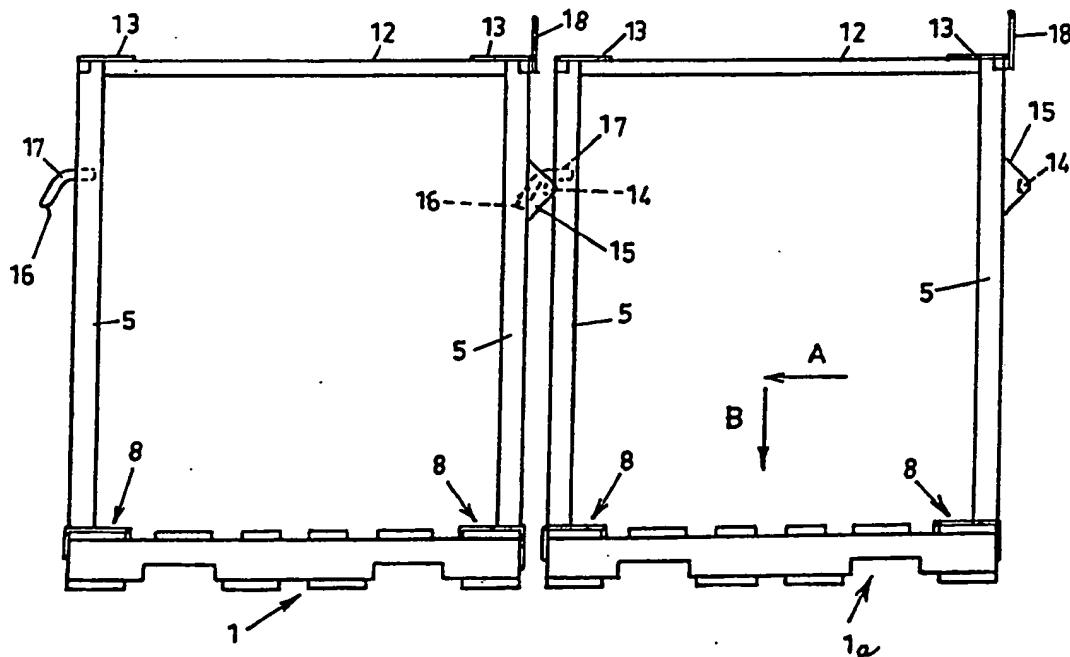
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(54) Title: PALLET CONVERTER



(57) Abstract

A pallet converter comprised of two inverted U frames each having two legs (5, 6) joined by a top rail (7), each leg (5, 6) is adapted at the top for engagement by a rail (12) whereby the U frames are rigidly interconnected, each leg (5, 6) is adapted at its lower end (8) to engage a corner of a pallet (1). Hook means (16, 17) on one U frame and hook receiving means (14, 15) on the other U frame enabling pallet converters to be hooked together by vertical relative movement between the pallet converters.

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" PALLET CONVERTER "

This invention relates to arranging loaded pallets in a stable manner.

In the storage of palletised goods it is economically desirable to stack several loaded pallets one on the other to form a tier and in this way to maximize floor space utilization. The stability of such tiers has been a problem in the past. In an attempt to solve this problem tiers were arranged in abutting relationship in rows to acquire 10 stability by mutual support of the tiers. The instability problem was reduced by this means to some extent but there was still lack of effective stability within tiers and rows of such tiers.

This invention has been devised to build on the last mentioned system by providing means to interlock adjacent loaded pallets and thereby acquire the desired stability.

Accordingly the present invention can be broadly said to provide a pallet converter comprising four uprights each with an upper end and a lower end with at least the upper 20 ends interconnected to provide an upper support means to support a superimposed load, said upright lower ends being adapted for coupling respectively to four corner zones of a pallet, complementary first and second coupling means on the pallet converter respectively located on opposed sides of

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the pallet converter and respectively engagable and disengagable with complementary coupling means on other like pallet converters by vertical relative movement between the pallet converters being coupled.

A presently preferred arrangement will now be described with reference to the accompanying drawings in which:

Fig.1 is a side view of a pallet converter of the present invention mounted on a pallet,

Fig.2 is a plan view of the pallet and pallet converter as  
10 illustrated in Fig.1,

Fig.3 is an end view of the arrangement of Fig.1, and

Fig.4 is a side view of two pallets fitted with pallet  
converters as illustrated in Fig.1 when coupled together.

In Fig.1 there is shown a pallet 1 of the four way entry type with bearers 2 and upper battens 3 and lower battens 4. U shaped end frames are provided at each end of the pallet. The end frames each comprise two uprights 5 and 6 interconnected rigidly by a top rail 7, best seen in Fig.3. The lower end of each upright 5 and 6 is provided with a  
20 "shoe" 8 having a top plate to extend over the top of an end of an end batten 3 with a downturned lug 9 to lock over the inner end edges of the batten, a downturned leg 10 to end abut the bearer and a wing 11 on the leg 10 to lie adjacent the inner face of the bearer. In this way each lower end of the uprights 5 and 6 is anchored to a corner of the pallet

after mounting on the pallet and being arcuately moved as indicated by the arrow in Fig.1.

The uprights 5 and 6 are tubular, or can be provided with upper socket ends, and the upper ends of the corresponding uprights of the two end frames are interlinked by tie bars 12 each having an end plate 13 (see Fig.2). Projecting downwardly from the underface of each plate 13 there is a spigot (not shown) to engage the open upper end of an upright. In this way the end frames are interlocked and the 10 result is a rigid converter frame with four uprights and four top links. Within the converter frame goods can be loaded onto the pallet and the frame will provide a rigid support for a superimposed load, such as a pallet with or without a like converter frame mounted thereon.

The term converter frame is used because a pallet (with or without a load) fitted with a converter frame is converted into a support structure for a superimposed load. The pallet plus converter is a form of racking. As will be understood a loaded pallet would almost invariably be 20 unusable for the support of a superimposed load, such as another loaded pallet, because of the nature of the load on the lower pallet.

Across one end frame there is a bar 14 supported in brackets 15 fixed to the uprights 5 and 6 of the frame and spaced from the frame uprights 5 and 6. Across the other end

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frame there is a like arrangement comprising a bar 16 with cranked ends 17 fixed directly to the uprights 5 and 6. It is to be noted that the ends 17 are also downturned so as to locate the bar 16 below the bar 14 and it will be seen from Fig.3 that the spacing between the ends 17 is less than the spacing between the brackets 15. Accordingly, as seen in Fig.4, the bar 16 can be hooked over the bar 14 in an interlocking operation wherein the pallet 1a (Fig.4) is manoeuvred into close proximity to the pallet 1 by a fork lift truck whilst raised and is then lowered. As will be understood other forms of hooking arrangement involving relative vertical movement between the members being coupled and uncoupled can be provided but the preferred arrangement is as just described with reference to the drawings.

There is plate 18 fixed to each bar 7 of each end frame fitted with the bar 14. It can be mounted in alternate locations if desired. The purpose of the plate 18 is to ensure that in a tiering operation each pallet must be raised a certain height before it can be moved across the top of the underlying converter frame thereby ensuring that the bar 16 of the pallet converter being stacked will be above the bar 14 of the already stacked or tiered pallet converter. The "hooking" of the pallet converters (by the movements of arrows A and B of Fig.4) can then be readily accomplished using the plate 18 as a fore and aft guide for positioning the to-be tiered pallet converter relative to the stationary pallet converter. Likewise in an unstacking

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operation the fork lift truck driver must execute a vertical lift of the pallet being lifted in order to clear the plate 18 of the underlying pallet converter to ensure uncoupling before horizontal relative movement is attempted.

It is envisaged that in a stack forming operation the bar 16 of the first (the end) pallet converter would be engaged with a stationary bar, the equivalent of a bar 14, fixed to a wall of a building or a post in the building or the like. In this way not only are the pallet converters interlocked 10 but the tiered row of pallet converters are locked to a rigid member thereby further stabilizing the tiered row.

Whilst a specific form of coupling device between pallet converters has been disclosed in the foregoing description it is to be understood that other forms of coupling may be used without departing from the scope of the invention. By way of example the member 16-17 could be upwardly projecting rather than downwardly projecting. It is however a feature of the invention that the coupling members will hold the pallet converters in close side by side relationship and 20 that the engagement and disengagement will be by vertical relative movement between converters.

I claim:

1. A pallet converter comprising four uprights each with an upper end and a lower end with at least the upper ends interconnected to provide an upper support means to support a superimposed load, said upright lower ends being adapted for coupling respectively to four corner zones of a pallet, complementary first and second coupling means on the pallet converter respectively located on opposed sides of the pallet converter and respectively engagable and disengagable with complementary coupling means on other like pallet converters by vertical relative movement between the pallet converters being coupled.
2. A converter as claimed in claim 1 wherein the uprights are permanently interconnected in pairs to provide two inverted U shaped frames which are interconnected by two tie members.
3. A converter as claimed in claim 2 wherein the connections between uprights and tie members is by spigot in socket connection.
4. A converter as claimed in anyone of claims 1 to 3 wherein the lower end of each upright is provided with a socket to engage the end of a pallet bearer and upper pallet batten at a corner of the pallet, said socket comprising a

first socket member to rest on the pallet batten, an inner flange and an outer flange on the first socket member to at least partly embrace opposed edges of the batten adjacent an end thereof, an extension to said outer flange projecting below said batten to abut the end of the associated bearer and a return flange on said extension at right angles thereto to lie adjacent an inner face of said bearer and below said batten

5. A converter as claimed in anyone of claims 1 to 4 wherein said first coupling means comprises bar supports on two adjacent uprights and a hook-on bar which is fixed to said bar supports so as to be spaced from the said two adjacent uprights and so as to lie substantially horizontal when the converter is mounted on a pallet, and said second coupling means comprises hook means supported from the other two uprights and spaced from the lower ends of said uprights so that coupling and uncoupling of the hook means with the hook-on bar requires vertical relative movement between said hook-on bar and said hook means.

6. A converter as claimed in claim 5 wherein the hook means is a hook-in bar supported through bent arms positioned such that said hook-on bar has a vertical elevation above the lower ends of the uprights which lies between the elevations of the hook-in bar and the connection of the said bent arms to the associated converter uprights.

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7. A converter as claimed in anyone of claims 1 to 6 including a coupling guide plate fixed to the converter and extending above the converter by an amount at least equal to the amount of vertical relative movement required to couple or uncouple the first and second coupling means of two converters.

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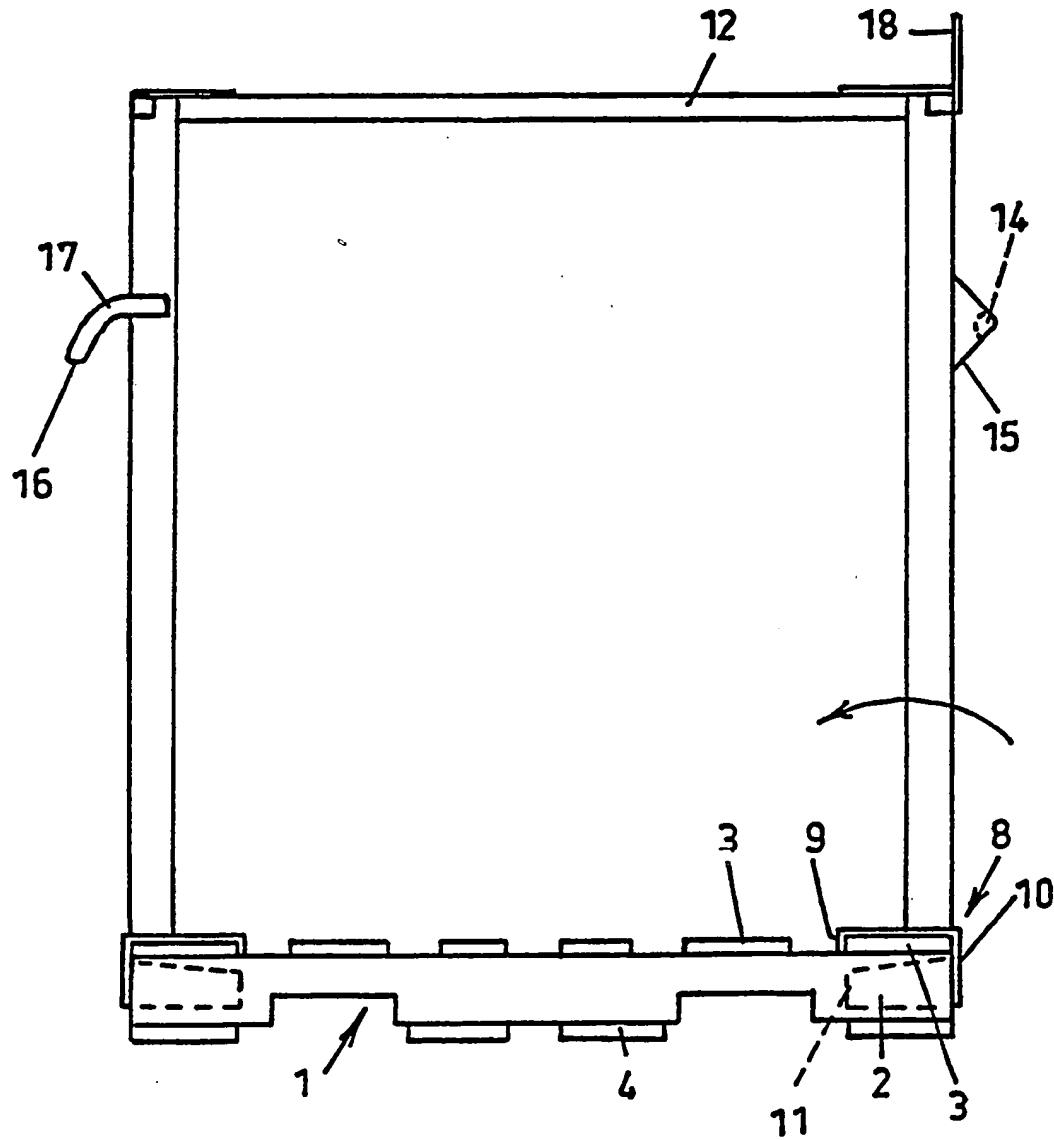


FIG. 1.

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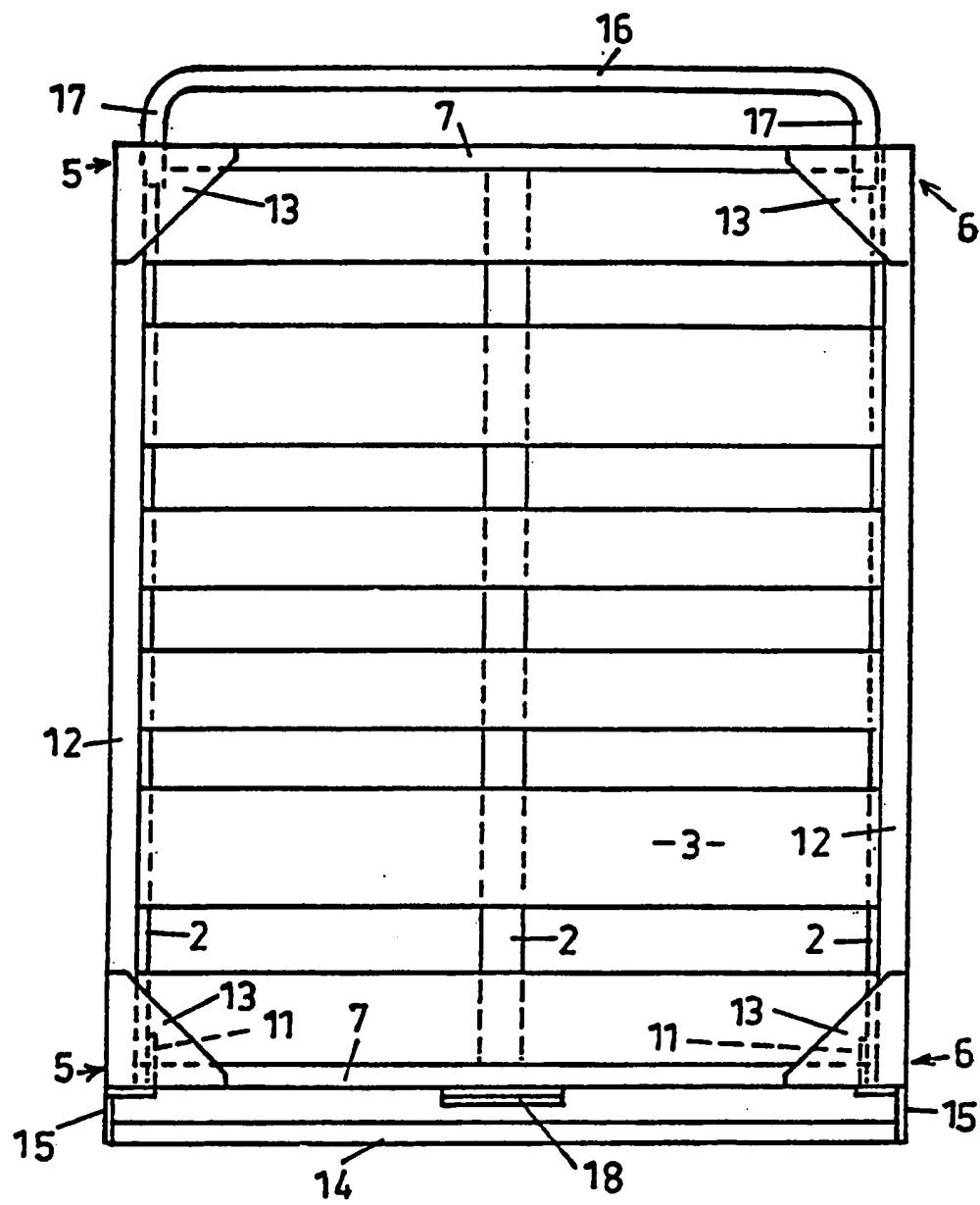


FIG. 2.

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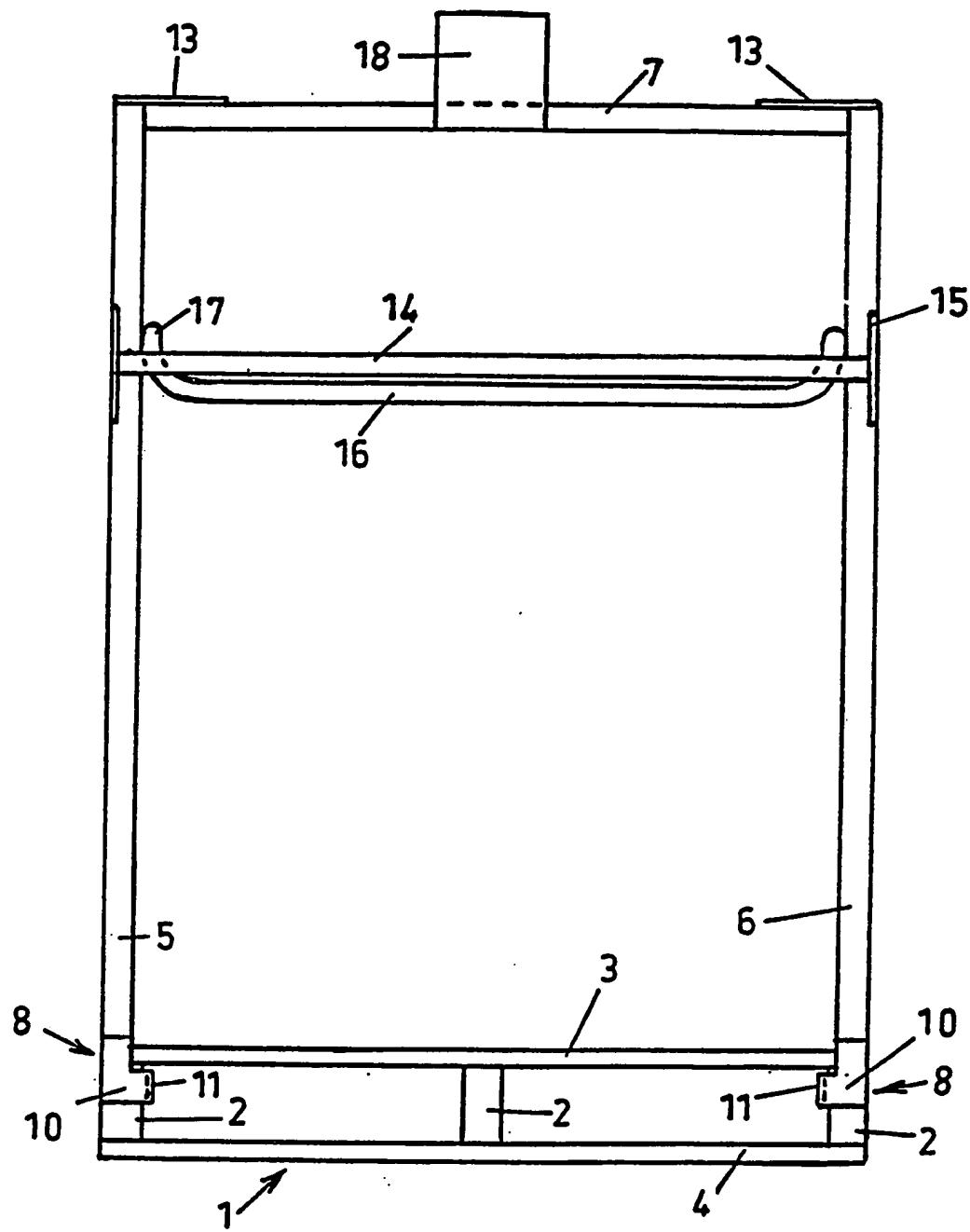


FIG. 3.

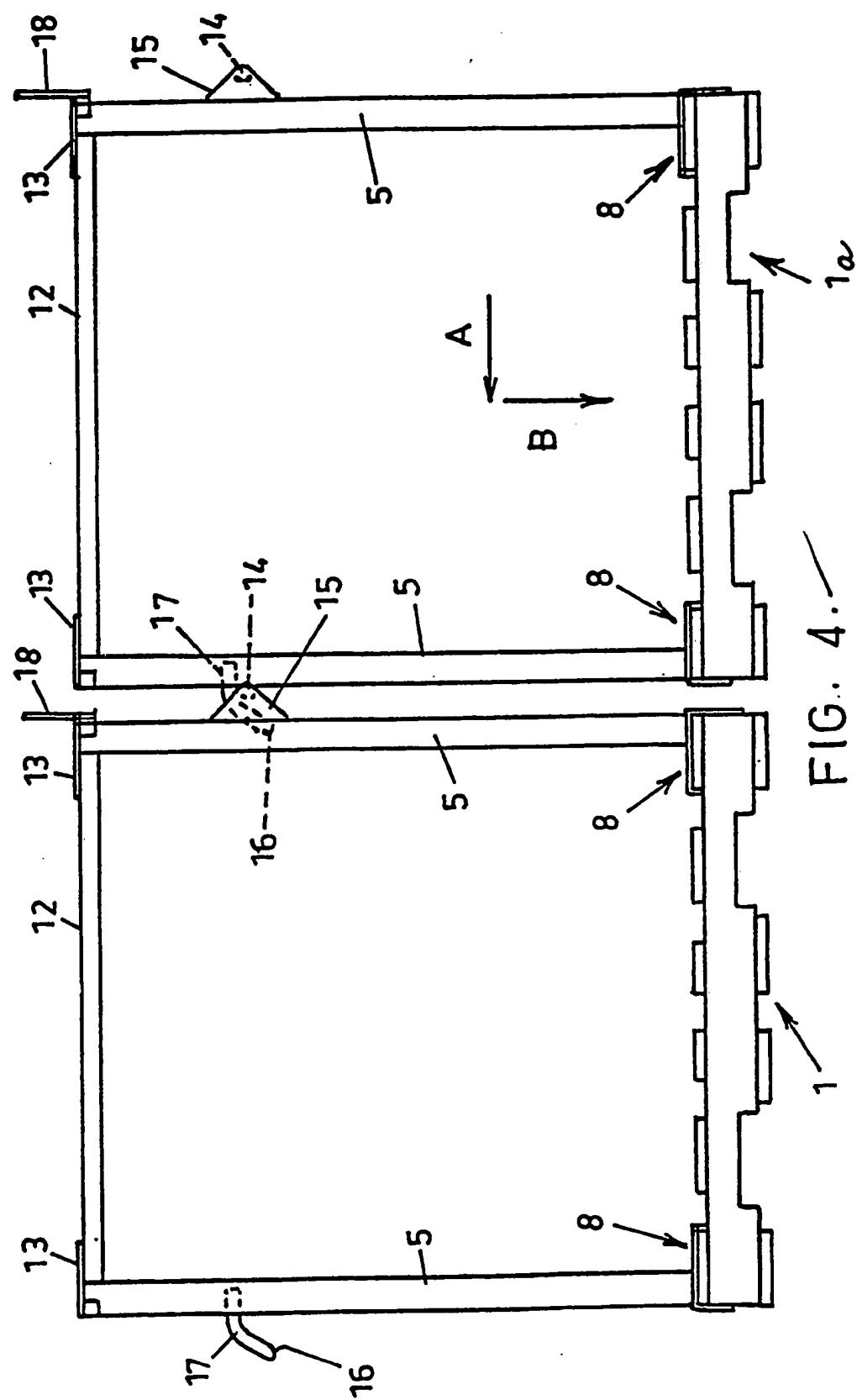


FIG. 4.—

**I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) 6**

According to International Patent Classification (IPC) or to both National Classification and IPC  
Int. Cl. B65D 19/38 // B65D 21/02

**II. FIELDS SEARCHED**

Minimum Documentation Searched 7

| Classification System | Classification Symbols |
|-----------------------|------------------------|
| IPC                   | B65D 19/38             |

Documentation Searched other than Minimum Documentation  
to the Extent that such Documents are Included in the Fields Searched 8

AU : IPC as above and B65D 19/08, 21/02

**III. DOCUMENTS CONSIDERED TO BE RELEVANT 9**

| Category* | Citation of Document, ** with indication, where appropriate,<br>of the relevant passages 12 | Relevant to<br>Claim No 13 |
|-----------|---|----------------------------|
| X,Y       | AU,A,45676/79 (RYDSTRAND) 17 January 1980 (17.01.80)  | (1-4)                      |
| X,Y       | AU,B,25113/77 (507585) (HILLS INDUSTRIES LIMITED) 16 November 1978<br>(16.11.78)            | (1-4)                      |
| Y         | AU,B,75911/74 (492386) (FISCHER and GUENTHER) 3 June 1976 (03.06.76)                        | (1)                        |
| Y         | AU,B,31296/57 (236121) (ARROWHEAD PRODUCTS, INC.) 20 March 1958                             | (4)                        |
| P,Y       | WO,A,89/00531 (O'SULLIVAN) 26 January 1989 (26.01.89)<br>See Figures 26-29                  | (1)                        |

## \* Special categories of cited documents: 10

- "A" document defining the general state of the art which is not considered to be of particular relevance
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- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "G" document member of the same patent family

**IV. CERTIFICATION**

|  |   |
|--|---|
| Date of the Actual Completion of the International Search<br>24 July 1989 (24.07.89) | Date of Mailing of this International Search Report<br><i>8 August 1989</i> |
| International Searching Authority<br>Australian Patent Office                        | Signature of Authorized Officer<br><i>G.M COX</i>                           |

## FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

## V. [ ] OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE 1

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [ ] Claim numbers ..., because they relate to subject matter not required to be searched by this Authority, namely:

2. [ ] Claim numbers ..., because they relate to parts of the international application that do comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. [ ] Claim numbers ..., because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4 (a):

## VI. [ ] OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING 2

This International Searching Authority found multiple inventions in this international application as follows:

1. [ ] As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. [ ] As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. [ ] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. [ ] As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

## Remark on Protest

- [ ] The additional search fees were accompanied by applicant's protest.
- [ ] No protest accompanied the payment of additional search fees.

## III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

| Category* | Citation of Document, with indication, where appropriate,<br>of the relevant passages | Relevant to<br>Claim No |
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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON  
INTERNATIONAL APPLICATION NO. PCT/AU 89/00262

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

| Patent Document<br>Cited in Search<br>Report | Patent Family Members |
|--|-----------------------|
| WO 8900531                                   | AU 20742/88           |
| AU 75911/74                                  | GB 2030267            |

END OF ANNEX